California Department of Transportation
Division of Engineering Services
Materials Engineering and Testing Services
5900 Folsom Blvd.
Sacramento, CA 95819-4612

7/11/05

APPROVED ADMIXTURES FOR USE IN CONCRETE

The list of Approved Admixtures for Use in Concrete is published periodically for reference primarily by Caltrans field personnel and others involved in Caltrans projects.

As per State of California, Department of Transportation, Standard Specifications (July 1999), Section 90-4.03, no admixture brand will be used in the work unless it is on Caltrans current list of approved brands for the type of admixture involved. Admixture brands will be considered for addition to the approved list if the manufacturer of the admixture submits to the Transportation Laboratory, 5900 Folsom Blvd., Sacramento, CA 95819, a sample of the admixture accompanied by certified test results which verify that the admixture complies with the requirements in the appropriate ASTM designation. The sample shall be sufficient to permit performance of all required tests. Approval of admixture brands will be dependent upon a determination as to compliance with the specifications, based on the certified test results submitted, together with any tests Caltrans may elect to perform.

For inquiries about this list contact Dr. Vijay Jain at (916) 227-7232 or vijay_jain@dot.ca.gov.

The Approved List includes only those admixtures that comply with the following ASTM designations:

The list provides certain essential data for field reference as well as general information that may assist in assessing properties of the plastic concrete.

The information contained herein may not be used for advertising purposes nor is it to be considered as an endorsement by Caltrans.

From ACI 212.1R, "Admixtures for Concrete"

5.2 - COMPOSITION

The materials that are generally available for use as water-reducing admixtures and set-controlling admixtures fall into five general classes:

1. Lignosulfonic acids and their salts
2 Modifications and derivatives of lignosulfonic acids and their salts
3. Hydroxylated carboxylic acids and their salts
4. Modifications and derivatives of hydroxylated carboxylic acids and their salts
5. Other materials, which include:

(i) inorganic materials, such as zinc salts, borates, phosphates, chlorides,
(ii) amines and their derivatives,
(iii) carbohydrates, polysaccharides, and sugar acids,
(iv) certain polymeric compounds, such as cellulose ethers, melamine derivatives, naphthalene derivatives, silicones, and sulfonated hydrocarbons.

These admixtures can be used either alone or in combination with other organic or inorganic, active or essentially inert substances.

NOTES:

* Chemical admixtures containing chlorides as Cl^- in excess of one percent by weight of admixture shall not be used in prestressed or reinforced concrete.

** When the Contractor is permitted to reduce cement content by adding chemical admixtures, the dosage of admixture shall be the dosage used in ASTM Designation C494 for qualifying the admixtures.

*** This admixture contains more than 1% chlorides as determined by California Test 415 and shall not be used in prestressed or reinforced concrete.

AE = Air Entrained
NAE = Non-Air Entrained

Type A - Water-reducing admixtures
Type B - Retarding admixtures
Type C - Accelerating admixtures
Type D - Water-reducing and retarding admixtures
Type E - Water-reducing and accelerating admixtures
Type F - Water-reducing, high range admixtures
Type G - Water-reducing, high range and retarding admixtures

ASTM C 494- Chemical Admixtures for Concrete

					At the qualifying ASTM dosage(s), what changes are expected relative to the reference concrete?			Dosage rate suggested by manufacturer	
Product name	ASTM type	Class or composition	Chloride content*, %	Dosage rates used to qualify for appropriate ASTM tests**, fl. oz. Per 100 lbs. of cement (report date)	Water reduction %	Change in AEA dose needed to maintain air content	Initial set retardation, (acceleration) hours	fl. oz. per 100 lbs of cement	See pg 2
W. R. Grace and Company 7237 East Gage Ave. Los Angeles, CA 90040									
ADVA Cast	F	Carboxylated Polyether	<1	6.3 (1997)	AE 15.3	More	AE 1.4	3.0 to 12.0	
ADVA Flow	F	Carboxylated Polyether	<1	6.0 (1995)	AE 12.8	More	AE 1.1	3.0 to 12.0	
ADVA 100	F	Carboxylated Polyether	<1	5.2 (1999)	AE 15.5	More	AE 0.0	3.0 to 10.0	
ADVA 140	A, F	Carboxylated Polyether	<1	4.2 (2002)	AE 5.6	More	AE 0.3	4.0-20.0	
ADVA 170	F	Carboxylated Polyether	<1	4.5 (2003)	AE 12.3	More	AE 0.4	3.0-9.0	
ADVA Cast 500	F	Carboxylated Polymer	<1	6.1 (2001)	AE 11.9	More	AE 0.3	3.0-12.0	
ADVA Cast 530	F	Carboxylated Polymer	<1	4.0 (2002)	AE 16.3	Less	AE 0.6	3.0-10.0	
ADVA Cast 540	F	Carboxylated Polymer	<1	6.0 (2002)	AE 13.5	Less	AE 0.6	5.0-20.0	
Daracem 50	A	Lignin, Calcium Chloride, and Polymers	>8	5.0 (1992)	AE 7.6	Less	Negligible	5.0 to 7.0	†
Daracem 55	A	Lignin, Calcium/Sodium Nitrate, Polymer	<1	4.0 (1992)	AE 5.8	Less	AE 0.9	3.0 to 9.0	
Daracem 100	A, F, G	Naphthalene Sulfonate	<1	8 (1991)	AE 11.5	Less	AE 0.3	9.0 to 11.0	
Daracem ML 330	F	Melamine-Formaldehyde Polymer	<1	14.5 (1998)	AE 15.4	More	AE 1.2	6.0 to 25.0	
Daracem 19	A, F	Naphthalene-Sulfonate Formaldehyde Copolymer	<1	8.0 to 25.0 (1981)	AE 20 to 30	Less	AE 0.5 to 1.0	8.0 to 25.0	
Daracem 65	A	Lignosulfonates, Melamine Polymer and Amine	<1	5.8	AE 6.7	Less	AE 0.7	3.0 to 9.0	
Daraset 200	C	Calcium Nitrate/Nitrite Based Solution	<1	30 (1998)	AE 8.3	More	AE (2.6)	10 to 100	
Daratard 17	B, D	Hydroxylated Organic Compounds	<1	3.0 (1992)	AE 8	More	AE 2.0	2.0 to 7.0	
DCI	C	Calcium Nitrite Aqueous Solution	<1	78.0 (1979)	Negligible	Same	AE (2.0)	50.0 to 170.0	
Mira 70	A, F	Carboxylated Polyether	<1	12.0 (1999)	AE 12.0	More	AE 0.7	2.5 to 15.0	
Mira 92	A, F	Carboxylated Polyether	<1	5.0 (2004)	AE 4.9	Same	AE (0.2)	2.5 to 15.0	
Polarset	C	Calcium Nitrate/ Nitrite Solution	<1	30.0 (1994)	AE 5	Same	AE (3.0)	8.0 to 100.0	

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WRDA 20	A	Glucose Polymers, Lignosulfonate, and Amine	<1	2.5 (1985)	AE 6.8	Less	AE 1.0	2.5	
WRDA 27	A, D	Modified Glucose Polymer	<1	3.0 (2003)	AE 6.7	More	AE 0.5	2.0 to-6.0	
WRDA 64	A	Lignosulfonate, Amine, and Glucose Polymer	z<1	3.0 (1979)	AE 11	Less	AE 1.4	3.0 to 5.0	
WRDA 79	A, D	Modified Lignosulfonate	<1	5.0 to 7.5 (1980)	AE 8 to 10	Less	AE 1.0 to 2.2	4.0 to 10.0	
WRDA 82	A	Lignosulfonate & Amine	<1	3.0 (1983)	AE 6.1	Less	AE 0.2	3.0	
WRDA w/Hycol	A	Organic Compounds w/Hydration Control Agent	<1	3.0 and 5.0 (1974)	AE 5 to 7	Less	AE (0.3) to 1.3	3.0 to 5.0	
Recover	D	Hydroxycarboxylic Acid Salts	<1	5.0 (1992))	AE 9.0	Same	AE 1.7	2.0 to 16.0	
Zyla 610	A	Carbohydrates & Amine	<1	2.0 (2004)	AE 5.2	Less	AE 0.3	2.0 to 4.0	

Hill Brothers Chemical Company
1675 N. Main Street
Orange, CA 92667-3442

HICO 610	A	Sodium Lignosulfonate	<1	5.0 (1987)	NAE 5.7	Not Tested for Air Entrained Concrete	NAE (1)	5.0 to 12	
HICO 911	C	Polymer Modified Calcium Chloride	>33	24 (1992)	NAE 2.7	Not Tested for Air Entrained Concrete	NAE (2.0)	32 to 64	†

Degussa Admixtures, Inc.
23700 Chagrin Boulevard
Cleveland, OH 44122

Delvo Stabilizer	B, D	Salts of Organic Agent	<1	4.0 (1992)	AE 7.8	Less	AE 1.1	2.0 to 130	
Glenium 3400NV	A,F	Based on Polycarboxylate Technology	<1	4.8 (2004)	AE 16.4	Less	AE 1.1	2.0-12.0	
Masterpave + (Plus)	A	Polymer, Triethanolamine	<1	3.0 (2005)	AE 5.5	Less	AE 0.9	3.0-7.0	
Master pave N	A	Glucose Polymer	<1	2.0 (1989)	AE 6.0	Less	AE 0.4	2.0 to 4.0	
Polyheed 997	A	Lignosulfonate, Triethanolamine	< 1	5.0 (1990)	AE 6.9	Less	AE 0.4	3.0 to 12.0	

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Polyheed 997	F	Lignosulfonate, Triethanolamine	< 1	8.0 (1990)	AE 12.3	Less	AE 0.3	3.0 to 12.0	
Polyheed RI	B, D	Cement Dispersing Agent	<1	4.0 (1994)	AE 7.6	Less	AE 1.25	3.0 to 12.0	
Polyheed FC 100	A,C,E	Cement Dispersing Agent	<1	9.0, 15.0 (1998)	AE 6.7	More	AE (0.7)	8.0 to 30.0	
Pozzolith NC 534	C	Cement Dispersing Agent	<1	27.0 (1993)	AE 5.7	More	AE (1.7)	10.0 to 45.0	
Polyheed 997	A, F	Lignosulfonate Triethanolamine	<1	5.0 (1990)	AE 6.9	Less	AE 0.4	3.0 to 12.0	
Pozzolith 122 HE	C, E	Cement Dispersing Agent	>24	17.0 (1998)	AE 5.5	More	AE (1.1)	16.0 to 64.0	†
Pozzolith 200 N	A,B,D	Cement Dispersing Agent	<1	4.0 (1998)	AE 6.9	Less	AE 0.7	3.0 to 5.0	
Pozzolith 220 N	A, B, D	Polymer, Triethanolamine	<1	3.5 (1991)	AE 5.8	Less	AE 1.8	2.0 to 5.0	
Pozzolith 300-R	B, D	Polymer	<1	5.0 (1990)	AE 10	Less	AE 2.6	3.0 to 5.0	
Pozzolith 322-N	A	Polymer, Triethanolamine	<1	4.0 (1990)	AE 8.0	Less	AE 0.7	3.0 to 7.0	
Pozzolith 80	A, B, D	Cement Dispersing Agent	<1	3.0 (1998)	AE 6.8	Same	AE 0.2	4.0 to 10.0	
Pozzutec 20	C, E	Polymer	<1	15.0 (1990)	AE 5.5	More	AE 1.1	5.0 to 90.0	
Rheobuild 1000	A, F	Naphthalene Sulfonate	<1	15.0 (1988)	AE 18	Less	AE 0.4	5.0 to 25.0	
Glenium 3000 NS (formerly Rheobuild)	A, F	Based on Glenium Technology	<1	4.0 (1998)	AE 12.4	Less	AE 0.2	4.0 to 6.0	
Glenium 3030 NS	A, F	Based on Polycarboxylate Technology	<1	6.0 (2001)	AE 36.6	Less	AE (0.1)	6.0 to 18.0	
Glenium 3200 HES	A, F	Based on Polycarboxylate Technology	<1	3.5 (2001)	AE 26.4	Less	AE 0.1)	2.0 to 14.0	
RMC 121	A	Lignosulfonate Triethanolamine	<1	5.0 (1990)	AE 6.9	Less	AE 0.4	3.0 to 12.0	
RMC 121	F	Lignosulfonate Triethanolamine	<1	8.0 (1990)	AE 12.3	Less	AE 0.3	3.0 to 12.0	
Rheocrete CNI	C	Calcium Nitrite Based	<1	1.0 (2001)	AE 4.8	More	AE (1.5)	18.5 to 110	
Masterpave +	A	Polymer	<1	3.0 (2002)	AE 5.7	Less	AE 0.9	3.0 to 7.0	

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Sika Corporation 201 Polito Avenue Lyndhurst, NJ 07071									
Plastocrete 161	A	Lignosulfate	<1	4 (1982)	AE 7.7	Same	AE 0.2	3.0 to 5.0	
Plastocrete 161 FL	C	Inorganic Salt-Organic Mixture	<1	16 (1987)	AE 5.4	Same	AE 1.25	12.0 to 24.0	
Plastocrete 161 HE	C	Calcium Chloride Triethylamine	>5	34 (1978)	AE 1.3	Less	AE (1.0)	6.0 to 64.0	†
Plastocrete 161 MR	B, D	Lignosulfonates	<1	2.9 (1989)	AE 7.4	Same	AE 2.4	3.0 to 6.0	
Plastocrete 169	A	Lignosulfonates	<1	4 (1985)	AE 8.73	Same	AE (0.25)	3.0 to 7.0	
Plastocrete 169	B, D	Lignosulfonates	<1	6 (1986)	AE 22	Same	AE 2.3	3.0 to 7.0	
Plastiment	B, D	Hydroxylated Carboxylic Acid	<1	4.0 (1990)	AE 7.3	Same	AE 3.1	2.0 to 4.0	
Sikament FF	F	Melamine Polymer	<1	12 (1994)	AE 12.2	Same	AE 1.3	10.6 to 21.2	
Sikament 86	F	Melamine Polymer	<1	12 (1994)	AE 14.4	Same	AE 0.7	10.6 to 21.2	
Sikament 300	F	Blend Sodium Alkylnapthalene	<1	12 (1992)	AE 12.2	Same	AE 1.0	6.0 to 24.0	
Plastiment NS	A	Lignosulfonates	<1	4 (1996)	AE 7.6	Less	AE 1.1	2.0 to 4.0	
Sika-Rapid- 1	C	RMF-1503	<1	20 (1996)	AE 3.1	Less	AE (1.6)	4.0 to 48.0	
Viscocrete 6100	A,F	Polycarboxylate Polymer	<1	6 (2003)	AE 23.4	Less	AE (0.8)	3.0 to 8.0	
The Euclid Chemical Company 19218 Redwood Road Cleveland, OH 44110-2799 Tel. No: (216) 531-9222									
Eucon RD1	F,G,	Sulfonated Naphthalene Formaldehyde	<1	4.0 (1990)	AE 15.3	Same	AE (1.0)	6.0 to 20.0	
Eucon LR	A,D	Lignosulfonate	<1	6.0 (1997)	AE 8.0	Less	AE (1.1)	4.0 to 6.0	
Eucon NR	A,D	Lignosulfonate Based Material	<1	3.0 (1997)	AE 6.7	Less	AE (1.2)	3.0 to 6.0	
Eucon NW	A,D	Lignosulfonate Based Material	<1	3.0 (1997)	AE 7.5	Less	AE (0.2)	3.0 to 6.0	
Eucon X-15	A	Lignosulfonate	<1	4.0	AE 5.4	Less	AE (0.1)	3.0 to 10.0	

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		Based Material		(1993)					
Eucon ACN 200	C, E	Calcium Nitrate	<1	50.0 (1999)	AE 6.5	More	AE (3.4)	10.0 to 60.0	
Eucon DS	B	Phosphates Salts	<1	4.0 (1998)	AE 3.0	Less	AE 1.2		
Eucon AcN	C, E	Blend of Admixture	<1	60.0 (1998)	AE 8.6	More	AE (1.6)	20.0 to 50.0	
Eucon SP	A, F	Sulfonated Napthalene Formaldehyde Condensate	<1	7.0 (1998)	AE 17.1	More	AE (0.2)	6.0 to 25.0	
Eucon HC	A, B, D	Carbohydrate Salts	<1	2.5 (1998)	AE 6.5 AE 7.3	Same Same	AE 0.6 AE 2.0	2 to 6	
Eucon TR	B, D	Carbohydrate Salts	<1	4.0 (1998)	AE 6.8	Less	AE 3.1	3 to 6	
Eucon SPC	A, F	Polycarboxylated Polymer and other additives	<1	5 (2001)	AE 13.2	Same	AE (0.1)	3.0 to 6.0	
Eucon SPJ	A, F	Polycarboxylate Polymer	<1	7 (2001)	AE 12.9	Same	AE 0.8	4.0 to 7.0	
Eucon X20	A, F	Lignin Family	<1	13 (2002)	AE 12.3	Lessa	AE 1.1	3.0 to 15.0	
Eucon LW	A	Lignin Family	<1	3.0 (1997)	AE 9.5	Less	AE 0.3	3 to 10	
Eucon HW	A	Lignin Family	>1	6.0 (1998)	AE 6.9	Less	AE 1.0	3 to 10	
ACC elguard HE	E	Calcium Chloride based Material	31-35	24 (1997)	AE 6.3	More	(1.5)	16 to 32	
Eucon 37	A, F	Napthlene Sulfonate	<1	16 (1999)	AE 18.31	Same	AE 0.7	10 to 16	
Eucon Retarder 100	D	Sodium Gluconate	<1	3 (1999)	AE 6.4	Less	AE 1.9	2 to 6	
Eucon MR	A	Calcium Nitrate & Calcium Ligno Sulfonate Material	<1	6 (1999)	AE 7.1	Same	AE 1.1	4 to 10	
Eucon WR	A	Calcium-Sodium Ligno Sulfonate	<1	5 (1997)	AE 8.3	Less	AE 0.5	4 to 5	
Eucon WR-91	A	Calcium Ligno Sulfonate	<1	3 (1999)	AE 6.4	Less	AE 0.6	2 to 6	

Fritz-Pak Corporation
11220 Grader Street, Suite 600
Dallas, TX 75238

Delayed Set	B, D	Modified Lignosulfonate	<1	3.0 (2001)	AE 7.5	Less	AE 1.2	1.0 to 1.7	

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FR-1	D	Formaldehyde	<1	2.5 (2001)	AE 7.5	Less	AE 1.1	1.5 to 2.0	
Supercizer #1	F	Formaldehyde	<1	7.0 (2001)	AE 12.5	Less	AE 0.4	5.0 to 7.0	
Supercizer #5	F	Formaldehyde	<1	6.0 (2001)	AE 14.6	Less	AE 0.2	5.0 to 7.0	
Supercizer #7	F	Formaldehyde	<1	6.0 (2001)	AE 15.5	Less	AE 1.4	4.0 to 12.0	

Axim Italcementi Group
P.O. Box 234
8282 Middlebranch Road
Middlebranch, OH 44652
Tel. No: (330) 966-0444

Catexol 800N	B, D	Lignosulfonate	<1	4.3 (2002)	AE 8.8	Less	AE 1.3	2.0 to-6.0	
Catexol 1000R	B, D	Lignosulfonate	<1	2.5 (2001)	AE 5.9	Less	AE 1.6	1.5 to 4.0	
Catexol 1000 SPMN	F	Sulfonated Napthalene Condensate	<1	10.0 (2000)	AE 13.1	Less	AE (0.3)	10.0 to 40.0	
Superflux 2000 PC	F	Polycarboxylated Polymer	<1	2.5 (2000)	AE 13.1	Less	AE (0.2)	3.0 to 10.0	
Catexol 2000 RHE	C, E	Calcium Nitrate	<1	16.0 (2001)	AE 5.5	More	AE 1.4	10.0 to 20.0	

Chryso, Inc.
10600 Hwy 62, Unit #7
Charlestown, Indiana 47111-0459
Tel. No. (404) 406-7966

Chryso Fluid AG	F	Calcium Salt of Sulfonated Naphthalene Formaldehyde	<1	12.4 (2004)	16.7	More	AE 0.58	4.5-45.0	
Chryso Fluid Optima 200	F	Modified Polycarboxylate	<1	11.6 (2004)	15.0	Less	AE 0.83	4.5-46.0	
Chryso Fluid Premia 180	F	Modified Polycarboxylate	<1	9.3 (2004)	19.9	More	AE 0.50	4.5-46.0	
Chryso Fluid Premia 190	F	Modified Polycarboxylate	<1	8.0 (2004)	19.2	More	AE 0.25	4.5-46.0	

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Chryso, Inc.
10600 Hwy 62, Unit #7
Charlestown, Indiana 47111-0459
Tel. No. (404) 406-7966

Chryso Fluid Optima 203	G	Modified Polycarboxylate	<1	11.0 (2004)	14.5	More	AE 2.08	4.5-46.0
Chryso Plast 850	A	Sulfonated Polynapthalene	<1	7.6 (2004)	8.4	More	AE 1.17	4.5-23.0
Chryso Plast CER	D	Hydroxycarboxylate	<1	3.6 (2004)	5.7	Less	AE 2.33	3.0-9.0
Chryso Plast Omega 101	A	Modified Polycarboxylate	<1	1.9 (2004)	7.5	Less	AE 2.33	1.5-23.0
Chryso Tard CHR	B	Lignosulfonate	<1	3.2 (2004)	0.4	Less	AE 2.17	3.0-15.0

Specco Industries
13087 Main Street
Lemont, IL 60439
Tel. No. (630) 257-5060

Auger Aid #1920	A	Lignosulfonate	<1	8.0 (2004)	7.0	Less	AE (0.1)	8.0-16.0	

ASTM C 260- Air-Entraining Admixtures for Concrete

Product name	Class or composition	Chloride content*, %	Date report was submitted	Dosage rate suggested by manufacturer, fl. oz. per 100 lbs of cement
Degussa Admixtures, Inc. 23700 Chagrin Boulevard Cleveland, OH 44122				
MBVR Standard	Vinsol Resin	<1	1991	0.4 to 4.0
MB-VR Concentrated	Vinsol Resin	<1	1992	0.4 to 4.0
MBAE-90 also called Pave Air 90	Rosin Soap	<1	1993	0.25 to 4.0
Micro-Air	Fatty acid Salts	<1	1991	1.0
Pave-Air	Vinsol Resin	<1	1992	1.0
W. R. Grace and Company 7237 East Gage Ave. Los Angeles, CA 90040				
Darex AEA	Organic Acid Salts	<1	1975	0.8
Darex II AEA	Alkaline Solution of Fatty Acid Salts	<1	1993	0.75 to 3.0
Daravair 1000	Neutralized Resin and Rosin	<1	1994	0.75 to 3.0
Daravair M	Neutralized Vinsol Resin	<1	1975	1.0
Daravair AT 60	Aqueous Solution of Neutralized Vinsol Resin, Amine and Fatty Acids	<1	1994	0.5 to 3.0
Sika Chemical Corporation 1372 East 15th Street Los Angeles, CA 90021				
Sika AER	Neutralized Vinsol Resin	<1	1986	0.5 to 1.5
Sika AEA 15	Sodium Salt Type Soap	<1	1983	0.5 to 1.5
Sika AEA 14	Sodium Salt of an Organic Ester	<1	1996	0.5 to 3.0
Hill Brothers Chemical Company 1675 North Main St. Orange, CA 92667-3442				
HICO-315-L	Sodium Tall Oil Fatty Acid Soap	<1	1968	0.75 to 3.0

ASTM C 260- Air-Entraining Admixtures for Concrete

Product name	Class or composition	Chloride content*, %	Date report was submitted	Dosage rate suggested by manufacturer, fl. oz. per 100 lbs of cement
The Euclid Chemical Company **19218 Redwood Road** **Cleveland, OH 44110-2799**				
AEA-92		<1	1992	0.50 to 1.0
Eucon Air 40	Resin Surfactant	<1	1997	1.0
Air Mix	Vinsol Resin	<1	2004	0.5 to1.0
Fritz-Pak Corporation **11220 Grader Street, Suite 600** **Dallas, TX 75238**				
Air Plus		<1	2001	0.25 to 1.25
Super Air Plus		<1	2001	0.25 to 1.25
Axim Italcementi Group **P.O. Box 234** **8282 Middlebranch Road** **Middlebranch, OH 44652** **Tel. No. (330) 966-0444**				
Catexol	Tall Oil & Diethyleneglycol	<1	2000	0.1 to 6.0
Chryso, Inc. **10600 Hwy 62, Unit #7** **Charlestown, Indiana 47111-0459** **Tel. No. (404) 406-7966**				
Chryso Air NVR	Neutralized Wood Resin	<1	2004	0.3 to 7.5
Chryso Air R2		<1	2004	0.3 to 15.0

ASTM C 618- Mineral Admixtures

Company name	Classification of mineral admixtures	Typical calcium oxide range in fly ash, %
Fly Ash		
(1) Boral Materials Technology 45 NE Loop 410 Suite 700 San Antonio, TX 78216		
(a) Mojave Fly Ash (Laughlin, Nevada)	F	8.5 to 9.9
(b) Apache Fly Ash (Cochise, Arizona)	F	3.0 to 8.0
(c) Snowflake Fly Ash (Snowflake, Arizona)	F	3.0 to 4.2
(d) Monticello Fly Ash (Monticello, Texas)	F	7.1 to 8.0
(2) Headwater Resources, Inc. 10653 S. Riverfront Parkway, South Jordan, UT 84095		
(a) Centralia Fly Ash (Centralia, Washington)	F	7.6 to 8.0
(b) IPSC/Delta Fly Ash (Delta, Utah)	F	9.1 to 9.9
(c) Hunter Fly Ash (Castle Dale, Utah)	F	7.9 to 9.9
(d) Navajo Fly Ash	F	6.5 to 8.0
(e) Jim Bridger Fly Ash (Rock Spring, Wyoming)	F	6.2 to 7.5
(3) Phoenix Cement Company 8800 East Chaparral Road, Suite 155 Scottsdale, AZ 85250-2618 Tel. No. (480) 850-5757		
(a) Cholla Fly Ash (Joseph City, Arizona)	F	3.1 to 5.0
(b) Four Corners Fly Ash (Fruitland, New Mexico)	F	2.4 to 2.8
(c) Escalante Fly Ash (Prewit, New Mexico)	F	2.5 to 4.8
(d) San Juan Fly Ash (San Juan, Waterflow, New Mexico)	F	5.8 to 7.8
(4) Mineral Resources Technologies, LLC 120 Interstate North Parkway East, Suite 440 Atlanta, GA 30339		
(a) Coronado Fly Ash (St. John, Arizona)	F	2.6 to 5.0
(5) Enx Inc. 9429-148th Street Edmonton, AB Canada Tel. No. (780-454-4199		
(a) Genessee Fly Ash	F	4.2 to 5.6

ASTM C 618- Mineral Admixtures

Company name	Classification of mineral admixtures	Typical calcium oxide range in fly ash,
Natural Pozzolans		
(1) Western Pozzolan Corp. 1748 Senecio Drive Larkspur, CO 80118		
(a) Lassenite SR	N	2.3%
(2) Engelhard Corp. Pigments & Additives Group 101 Wood Avenue P.O. Box 770 Iselin, NJ 08830		
(a) MetaMax EF High Reactivity Meta Kaolin	N	<1%
(3) Advanced Cement Technologies 435 Martin Street, Suite 2040 Blaine, WA 98231		
(a) Power Pozz High Reactivity Metakaolin	N	<1%

ASTM C 1240- Silica fume

Company name	Product name

Silica Fume

(1) Degussa Admixture, Inc.
23700 Chagrin Boulevard
Cleveland, OH 44122-5554
(216) 839-7500

Rheomac SF 100 Densified

(2) W.R. Grace & Company
62 Whittenmore Avenue
Cambridge, MA 02140-1692
(617) 498-4555

Force 10,000 D Densified